



Frederick de Kropf

metabolism, local and general, to a degree that no other therapeutic agent is capable. No measure is so energetic in removing the induration where stasis is established, restoring function and nutrition to the parts, as the static current; and no agent can be made to surge in and out through the cells of the body, arousing them to activity, as the static current does. Electricity, then, *resolves induration and increases metabolism.*

The high frequency currents variously applied and employed induce hyperemia, lower arterial tension, influences to materially increase metabolism, and destroy neoplasms and adventitious tissue. These effects are positive and cannot be disproved.

The Roentgen ray, a production of electricity, inhibits and arrests hyperactive processes. It destroys germ life. It removes neoplastic and malignant tissue. It arrests hemorrhage. These actions are likewise positive, certain, and in the hands of those who understand their properties and methods of use are always to be depended upon.

The constant current by ionization diffuses metallic substances into the tissues, destroys condolemata and neoplastic tissue. It induces hyperemia, thereby altering local metabolism. It removes scar tissue, and destroys germs, if locally applied by metallic electrolysis to infectious regions.

If electrical currents do no more than produce these effects (and they do more) they must be looked upon, not askance, not to be ridiculed, or tabooed, but to be recognized and introduced into general use as rapidly as possible by the slow moving conservative medical profession.

It is the duty of those who know and can demonstrate these things to do so, in every way in their power for humanity's sake, to force their general recognition and adoption by the skeptics, compelling them to employ these virile modalities and lay aside the foolishness now so rife with many members of the medical profession.

THE ATTITUDE OF THE PROFESSION TOWARDS PHYSICIANS WHO EMPLOY PHYSICAL THERAPEUTICS AND HOW TO MEET IT.

It is a notable fact that physicians who employ radiant energy, the static machine, mechanical vibration, and the other physical measures in their work are habitually ridiculed when they mention their value or importance in medical meetings by those who know little or nothing of their indications or use. Neighboring physicians likewise endeavor to put them down and discredit him in the community as they would a quack or osteopath.

Investigate the great hospitals of the country and see how many of them are employing physical therapeutic apparatus and how many of the internes and nurses know nothing about their indications or employment.

Read the recent prospectus of the medical colleges and note how few of them give any attention whatever to the employment of electricity, light, mechano-therapy, and the Roentgen ray.

Read the book reviews, particularly of the *Journal of the American Medical Association*, and note the ignorance displayed by some reviewers of medical books on the subject. Nothing can be more amusing to the medical man informed in the employment of these measures than the criticisms and comments on such works in the official organ of the American Medical Association.

The reason for this professional intolerance is not due to the fact that there is no indication for the scientific employment of these measures, but, on the contrary, that there is, and that it is dangerous to have it acknowledged. Such an attitude might be termed as dishonesty in members of the profession who are ignorant of a subject requiring technical knowledge to employ or discuss it, and are unwilling to investigate it or tolerate those who do, lest it bring discredit upon them for not employing them themselves.

An honest physician has said to the writer recently that "if I investigate these measures and find them valuable, as they are reported to be, I should be in honor bound to employ them with my patients or send them to those who can." Other

medical men come to us with the statement that I want to buy this or that thing with which to treat my patients with electricity, because "if I don't they will go to the fellows who do." It is surprising, however, what a small percentage of men who are desirous of employing these measures, "because their patients are going to others," have any knowledge, or seek a definite knowledge of how to employ them, which is a great mistake, for such men can at best only partially succeed and are certain to bring discredit upon those who do.

There is no work in medicine calling for greater skill in the matter of technique to derive uniform results than the employment of the physical measures, particularly of electricity, and no work in which a bungling technique is more certain to discredit its use with the community.

The remedy for this state of things demands that all who would succeed and bring credit to the methods and to themselves must become fully conversant with what pertains to the employment of these important measures.

Let every man who knows his subject at every opportunity present the facts and defend them.

THE TWENTIETH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE meeting to be held of the American Electro-therapeutic Association at Saratoga Springs, N. Y., on the 13th, 14th and 15th of September, has promise of being one of the most profitable in the history of the Association from a scientific point of view. The variety of titles in the appended program from the distinguished members of the Association are reassuring.

The hospitality of the medical profession and the proprietors of the Hotel and Springs at Saratoga promises an enjoyable occasion in every particular.

The registration office, assembly room and exhibits will be in the Hathorne Springs Building, which has been generously donated for the use of the profession for that purpose. The wiring and insulation will be gratuitously provided by the citizens of Saratoga. By courtesy of their several managers

the Association has been granted the freedom of the Hathorne, Vichy, Geyser, Patterson and Lincoln Springs.

Arrangements have been made with the United States Hotel for special rates and accommodations for members and their guests at \$4 per day, American plan.

Those who wish to join a party who will leave New York by the Albany night line on Monday, September 12th, returning Thursday night, September 15th, should notify the Secretary, Dr. J. Willard Travell, 27 East 11th St., New York, and he will make reservations for staterooms for them.

PROGRAM. PAPERS TO BE READ AT THE TWENTIETH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

1. The Physics of Light Therapy. Dr. T. D. Crothers, Hartford, Conn.
2. The American Electro-Therapeutic Association: the Relation of Its Work to Cellular Changes. A Retrospective Resume. Dr. Margaret A. Cleaves (a founder member), New York.
3. Report of X-Ray Treatment of Spleno-Myelogenous and Lymphatic Leucæmia, with Blood Findings of Each. Dr. J. W. Torbett, Marlin, Texas.
4. Report of a Case of Splenic Leucæmia Successfully Treated by Modern Methods. Dr. G. W. Strobell, Rutland, Vt.
5. Electric Anesthesia in Human Surgery. Dr. Louise G. Robinovitch, New York.
6. Psoriasis. Dr. Herbert McIntosh, Boston, Mass.
7. Some Blood Studies in Roentgen Therapy. Dr. J. D. Gibson, Denver, Colo.
8. Blood Pressure: Its Treatment by Electricity and Magnetism. Dr. W. J. Dugan, Philadelphia, Pa.
9. The Treatment of Inflammation. Dr. William Benham Snow, New York.
10. Electricity in the Treatment of Gout. Dr. Frederick deKraft, New York.
11. Some Laboratory Findings in Diseases of Metabolism, which Question that These Are only of Metabolic Origin: the Role of Chronic Intestinal Disorders in the Production of Some of Them. Dr. Anthony Bassler, New York.
12. Treatment of Infantile Paralysis. Dr. A. W. Baer, Chicago, Ill.

13. Lumbago. Dr. F. Howard Humphris, London, England.
14. Light Baths. Dr. J. H. Kellogg, Battle Creek, Mich.
15. A Noteworthy Case of Sciatica. Dr. J. Willard Travell, New York.
16. The Treatment of Accessible Malignant Growths and Minor Surgical Conditions by a New Process (Oscillatory Dessication). Dr. William L. Clark, Philadelphia, Pa.
17. Electricity in Diseases of the Nose and Throat. Dr. Frederick M. Law, New York.
18. Untoward Action of the X-Ray and Its Treatment. Dr. W. H. Mick, Omaha, Neb.
19. Enforced Compensation. Dr. Gustavus Werber, Washington, D. C.
20. The Treatment of Chronic Metritis with Descent or Displacement. Dr. G. Betton Massey, Philadelphia, Pa.
21. Remarks on the Electrical Treatment of Interstitial and Hemorrhagic Fibroids of the Uterus. Dr. G. Betton Massey, Philadelphia, Pa.
22. The Etiology and Treatment of Eczema. Dr. Herbert F. Pitcher, Haverhill, Mass.
23. Osteo Arthritis of the Spine. Dr. Frank E. Peckham, Providence, R. I.
24. High Arterial Blood Pressure with Treatment. Dr. Byron S. Price, M.D., New York.
25. Modern Malpractice in Gynecology. Dr. Arthur W. Yale, Philadelphia, Pa.
26. The X-ray and Light in Infections. Dr. F. C. Tice, Roanoke, Va.
27. Treatment of Cataract by Electricity. Dr. Samuel J. Harris, Boston, Mass.



THE STATIC TREATMENT OF RHEUMATOID ARTHRITIS.

BY WILLIAM D. MC FEE, M.D., HAVERHILL, MASS.

In presenting this paper it is assumed by the writer that we are all more or less familiar with the *modus operandi* of the various static currents as the brush discharge, sparks and wave current, and the limited time will not allow for their description or for much reference in detail to the technique employed in using them.

The atrophic type of rheumatoid arthritis is a disease of disturbed metabolism and a resulting condition of malnutrition as shown by wasting of muscles and poor circulation. Nervous wear and tear appear to be a prominent etiological factor.

In the hypertrophic form constitutional disturbance is slight, this type of the disease according to more recent authorities being probably due to faulty elimination.

The use of static electricity puts the patient in the best possible condition to combat this disease, as it stimulates the local as well as general metabolic processes.

This current increases the resistance of the individual, thus encouraging the process of repair, and the condition of malnutrition which is so characteristic in sufferers from atrophic arthritis is relieved and improved by its use. It is also very helpful in maintaining the nutrition of muscles and encourages elimination.

The static current has great possibilities as a constitutional treatment in relieving the condition of nutrition, and improving the disturbed metabolism which accompanies rheumatoid arthritis.

The secretions and excretions are stimulated to increased activity and in no other way can functional disturbances and conditions of abnormal inactivity be so speedily and surely restored as by the use of the various static currents.

The local effect of the static wave current, sparks and brush discharge relative to the conditions found in rheumatoid arthritis, is the relief of congestion as evidenced by the reduction of swelling and easing of pain, also the improved metabolism of the joints from increased circulation.

at the same time more shallow and superficial. After a short stay—15 minutes—in the light cabinet, however, the respiration becomes uniformly regular and normal. Decided increase in the elimination of carbon dioxide evidencing the active oxidation and tissue changes by their action. He states the average of CO₂ eliminating a 30 minute incandescent light bath was 5.13 per cent., an increase of 44 per cent. The writer enumerates different conditions in which he has found the incandescent light baths useful: (1) lowered nutrition, the acid dyscrasias, (2) in the lipogenous dyscrasias, obesity, biliary lithiasis, betis, arthritic manifestations of gout and rheumatism, (3) alterations of the blood state, (4) nervous conditions, (5) respiratory and circulatory conditions, (6) diseases of the kidneys, (7) surgical conditions—as chronic tuberculosis, inflammatory diseases of bones, chronic leg ulcers, etc., (8) anemias, (9) as a hygienic measure. He finds that a marked action on the vaso-dilators of the arteries is established by these baths. (1) By the stimulation imparted to the blood is permitted to flow more rapidly to the surface; in this way the heart is relieved of its burden, and at the same time the constriction of the arterial circulation and the tension of the blood stream with an increase in its volume is also lessened. From this action there ensues lower tension of the blood stream with an increase in its volume and uniformity.

(2) A distinct revulsive effect by the dilatation of the cutaneous vessels is brought about. For the time being the blood is checked, in the skin, the "peripheral heart." In this way peripheral venous congestions are connected with active arterialization.

(3) Profound action upon the sweat glands with consequent active elimination.

(4) Increased oxidation.

These results from these effects, he claims, a return to normal skin activity, normal circulation and oxidizing power of the part of the organism. The general tone is increased with it physiological resistance.

The use of only violet globes in the cabinet increases elimination of toxic material to the promotion of oxidative processes. He advises the baths to be given every other day, to the point of producing vigorous perspiration and

exposures may be continued for too long a time. The author recommends the Scotch douche as a means of after treatment. Also mechanical measures such as massage, vibration, or the use of the electric current. The general application of the static breeze will aid.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERIC DE KRAFT, M.D.

The Thermic Effects Produced by High Frequency Currents.
By Dr. M. Nagelschmidt, *Archives of the Roentgen Ray* for July, 1910.

The author says that the heat production was known to Tesla and others from the very beginning.

A constant current passed through insulated water will cause bubbles of hydrogen and oxygen to form at the two poles, with a solution of starch and K. I. at the negative pole, no such action is observable with a true high frequency current. The constant current will cause but little rise of temperature while the high frequency current, which excites but little chemical action, will soon cause the water to boil. The constant current applied too long or too strong may cause serious injury, due to electrical dissociation, but there is no feeling of heat.

A patient connected to a high frequency current by means of a large electrode on the chest and back will be conscious of no sensation except a pleasant feeling of warmth, even though 3 or 4 amperes may be passing. If we pass a high frequency current through a piece of raw meat for a few seconds and then cut through the meat transversely, we will see the lines of force between the electrodes marked out by the coagulation of tissue.

Place the white of an egg in a rectangular glass tray, place an electrode at two opposite corners and pass a fairly strong high frequency current for five minutes and you will see a small coagulation clot formed along the line joining the electrodes. This clot begins in the middle and is separated from each electrode by a layer of fluid albumin; as the current continues to flow the clot gradually grows larger towards the electrode. With a stronger current the metal becomes warm quickly, producing greater coagulation in the neighborhood of the electrode, while in the center there is some spreading out of the lines of force, resulting in less heat and later coagulation. In the high frequency current of low tension we have an irradiation in a straight line from electrode to electrode.

The application of high frequency currents with the high voltage and intensity needed for diathermy is fraught with the gravest danger to the patient if used by persons who are not familiar with the technique and measurement. In his early operations on the human subject it is wise for the physician to use currents of low intensity rather than to run the risk of injury to the patient. A solenoid large enough to permit the introduction of a patient's arm is used to connect a high frequency current of high amperage and low voltage. A patient's arm placed herein will be speedily heated so that a ring or bracelet soon becomes too hot to bear. A thin leaf of tinfoil placed on this solenoid melts and disappears in an instant.

A patient lying on the auto-condensation couch and holding an electrode to the powerful current necessary for diathermy feels a sensation of heat which soon becomes almost unbearable.

The same effect is obtained by the bipolar use of the ordinary d'Arsonval apparatus.

The thermic effects are feebler than with the diathermic apparatus, in consequence of the small amperage and high voltage which is not adapted for the production of heat. With the more powerful diathermic apparatus we obtain a well-marked heating effect, which may be raised to a point which would produce tissue destruction. According to the dose and mode of application, the high frequency current may act either as a derongesting method to lower the blood pressure, or by raising the blood pressure may influence the tone of the local or general blood-vessels. The high frequency current may produce normal or pathological excitation of the nerves; they can stimulate the tonicity or irritate the vitality of the cells and cell complexes.

He considers the thermic effects of high frequency currents as the principal factor in the production of its secondary effects. The general high frequency application with the solenoid or couch are sedative and lower blood pressure. In arteriosclerosis of the coronary arteries, the bipolar method, one small electrode to the apex, the other to the base of the heart, may be used. In dilatation of the heart and myocarditis the result is most marvelous. The heart shrinks during treatment, the pulse becomes normal and regular and the rhythm is increased during the treatment.

By the use of large electrodes and longer applications it is possible to elevate the bodily temperature considerably. This is the result of a fresh supply of energy introduced from without, an increase of heat is supplied to the cells and tissues and the stimulation of the nutrition exchanges in a secondary result of this import of heat.

All gland secretions are strongly stimulated.

The cutaneous glands secrete sweat and sebum more freely. There is often a considerable augmentation of the urine, the specific gravity remaining high.

The liver secretes a larger amount of bile. No organ is so deeply seated as to be beyond the reach of the warmth of the high frequency current. The sedative action of diathermy is marked in painful affections of the nerves and joints. The treatment of tuberculosis of the lungs requires the greatest caution on account of the danger of bleeding as a sequence of secondary hyperemia.

He alludes to the possibility of utilizing diathermy for the purpose of sterilizing tuberculosis or suppurating glands, abscesses and the like before surgical intervention.

We possess in d'Arsonvalization a powerful means of applying electric energy in the form of heat without any secondary electric effect. This application is a dosable and localizable means of applying the therapeutic action of heat—a means of cure which has been utilized from the earliest times.

DIETETICS.

EDITED BY DR. B. S. PRICE.

Principles of Dietetics in Digestive Disturbances. A. Bickel, Medizinische Klinik, Berlin.

Does a light digestible diet refer to foods which are easily influenced by the ferments, or easily passed along out of the stomach, or not inducing much secretion of the digestive juices, or does it mean easily absorbed? The particular incompetency in each case requires that the diet should conform to the individual conditions and requirements. The writer refers to the need for more research upon this subject. The physical structure and the chemical composition of the food influences the motor and secretory functioning. There is less demand upon the motor function and less stimulus for secretion when the food is finely divided. There is greater motor stimulation from low temperatures, and greater secretory stimulus from more concentrated foods. The chemical composition of food is important. Human milk passes out of the stomach quicker than cows' milk of the same degree of dilution. Articles having little, if any effect, in stimulating gastric secretion are: water, alkaline mineral waters, tea, cocoa, cream, egg albumin, other pure native albuminoids in aqueous solutions, and 0.9 per cent. salt solution. He here classes solid foods: boiled meat, fats of all kinds, boiled vegetables, starch and sugar (vegetables in the form of puree), white meat and fish finely divided. On the



Frederic de Krieff

THE TWENTIETH ANNUAL MEETING OF THE AMERICAN ELECTROTHERAPEUTIC ASSOCIATION
 Held at Saratoga Springs, N. Y., September 13th, 1910.

The Twentieth Annual Session of the American Electrotherapeutic Association was called to order by the president, Dr. Thomas D. Crothers, at 9:50 A.M., September 13th, 1910. Following the report of the Board of Trustees was received. Following a regular motion the president appointed Drs. Snow and Pitcher as a committee to take action upon nomenclature.

A communication from Dr. Davis relating to nomenclature was referred to the Committee on Induced Currents. Dr. Crothers sent greetings.

The following were elected to Fellowship: Drs. Frederic R. Boyd, St. Louis, Mo.; E. R. Carpenter, El Paso, Texas; J. Curtis Webb, London, England; L. E. Creasy, London, England; Lewis D. Mason, Brooklyn, N. Y.; B. B. Grover, Colorado Springs, Colo.; James Metcalfe, Frizinghall, Bradford, Yorks, Eng.; A. Robert Taft, Charleston, S. C.; C. F. McGinness, Charleston, S. C.; Neal Luther Hoskins, Detroit Mich.; Frank Little, Brooklyn, N. Y.; Alice B. Condict, Orange, N. J.; Henry J. Stubbs, Wilmington, Del.; Z. B. Babbitt, Washington, D. C.; Charles F. Mills, Farmington, Mass.; Ningpo, China; John Jos. Kindred, Astoria, L. I.; George L. Forbes, Burlington, Vt.; E. E. Norwood, Kingston, N. Y.; Alfred I. Thayer, Glens Falls, N. Y.; H. A. Staley, Schenectady, N. Y.; James T. Gallagher, Brooklyn, N. Y.; Miss Ettie Sayer, London, Eng.; Anthony Bassler, New York, N. Y.; A. S. Higgins, Manasquam, N. J.; Alder C. Muttart, New York, N. Y.; H. E. Baright, Saratoga Springs, N. Y.

The Committee on Arrangements and Exhibits rendered report in which much praise was given Mr. Frank Hart for the Saratoga Publicity Commission and the United States Hotel for their cordial welcome and because of the above facilities placed at our disposal.

Proceeding to the scientific session the President's Address was "The Physics of Light Therapy." Dr. Thomas Crothers of Hartford, Conn. The regular committee followed:

On Direct Continuous Currents, including Electro-Chemical Surgery, Ionization, and all apparatus with. Dr. G. Bates Murray.

into the rectum. The tube is connected to a seven-inch piece of stomach or rectal tube and passed into the rectum over the prostate, the proximal end of the copper tube being attached to a fountain syringe from which one to two ounces of tincture of iodine in normal salt solution is passed into the rectum.

This copper tube is connected to the negative binding post of the continuous current, thus giving hydroelectric ionic medication from both sides of the prostate and deep urethra affected through mucous membranes. From five to fifteen milliamperes for five to ten minutes is given every second or third day.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERIC DE KRAFT, M.D.

The Method of Diathermy in Surgery. By Dr. Nagelschmidt.
Archives of the Roentgen Ray, September, 1910.

In order to produce a destructive action at least 70° C. are necessary. At this temperature a white discoloration of the skin, with grayish tint of the superficial tissues, with complete coagulation of the blood, local sealing of the vessels, and destruction of tissue is produced.

The quantity of heat evolved may be regulated by varying the strength of the current and the size of the active electrode.

With a large electrode the temperature of coagulation is reached after the lapse of considerable time, while with a small electrode of one m.m. to two c.m. coagulation may be produced with relatively weak currents.

For a superficial operation a large indifferent electrode is applied to any part of the body and small active electrode of one c.m. to the seat of disease. A current of $1\frac{1}{2}$ amperes will produce a white coagulation of the skin in 10 to 15 seconds. An application continued for 30 or 40 seconds extends the coagulation to one c.m. in depth.

We may also use two active electrodes each one c.m. in diameter, at a distance of two c.m. from one another. This gives a coagulation zone of three c.m. by one c.m. Or where we wish to localize the action to a very small spot a needle electrode may be used with $\frac{1}{4}$ ampere of current for a second. These methods are applicable to all forms of tuberculosis of the skin and mucous membranes.

Local cocaine anesthesia is sufficient. In obstinate papulose and syphilitic ulcer this method has proved satisfactory. Chronic varicose ulcers often heal speedily under the inflammatory reaction, the hyperemia, and the increased flow of lymph which follows a diathermic application. Naevus vasculosa, hemorrhoids, hypertrophy of the mucous membranes, angioma cavernosa of the throat and head in young children are successfully treated.

In benign tumors of the skin, atheromatous cysts, fibromata, myomata and naevi diathermy is indicated. A needle electrode passed into the nerotic plug of a boil will with but a small amount of current, coagulate the whole, cure the boil and prevent the further extension of the infection. Malignant tumors on the surface of the body may be coagulated between two active electrodes, or if deemed advisable we may use an indifferent electrode, and destroy the disease little by little with a small active electrode, extending the operation into the healthy tissue as much as may be necessary.

Even very large tumors may be removed successfully by diathermy.

If the tumor is subcutaneous or in the tissues of the body remove by surgical procedure, and then the diathermy operation is conducted aseptically.

Diathermy sterilizes the flora of operation, all its bacterial flora, without any fear of hemorrhage. Even large arteries such as the sublingual may be divided and the ends coagulated by 1 to $1\frac{1}{2}$ amperes of current. In coagulating large tumors it is best to remove one layer after another, always to a depth of about one c.m. The coagulated layer can be removed with a swab of cotton, wool or a curette. In this way we can distinguish the boundaries of a pathological growth. The destructive action of heat produced by high frequency currents

Journal of Advanced Therapeutics
Oct., 1910] is indicated in a great number of superficial lesions, and in combination with surgery in a large number of cases of deeper origin. The copious lymphorrhœa after all diathermic operations assists in carrying off the toxic products. There is no possibility of the dissemination of the germs of cancer or sarcoma during an operation.

SERUM THERAPY.

EDITED BY I. OGDEN WOODRUFF, M.D.

Immunity in Tuberculosis Considered from the Experimental and Clinical Standpoint. F. M. Pottenger, Jour. A. M. A., June 18, 1910.

He points out that animal experimentation has shown that a primary infection with tuberculosis immunizes against further inoculation from without; but that unless this primary focus is healed it does not immunize against reinoculation from the focus itself, and that the animal may die from reinoculation from the focus within its own body.

He then goes on to state that the present method of treating tuberculosis while effective is far from satisfactory; that we have no assurance that the disease is more than quiescent, as slight foci may, by careful living, be kept latent for long periods of time, and yet later break out into active disease. A sufficiently long treatment with tuberculin will, however, if continued for five or six months, immunize or cure a very large percentage of incipient cases of tuberculosis nearly all prior to the open stage.

Bearing this in mind, and also the fact that a large number of children are infected with tuberculosis early in life, he raises the question as to whether it is not the physician's duty to institute tuberculin treatment in as many children as possible who show a positive tuberculin reaction.

Regarding the use of tuberculin he further states: "That when properly given in the more advanced cases tuberculin fortifies the patient by an increased immunity so that he is better able to prevent reinoculation from the bacilli which escape from the focus of his disease, as is proved by the fact that a larger percentage of patients so treated attain an apparent cure and by the further fact that they are not subject to so many or such severe tuberculous complications as are found when they are not so treated.

"That tuberculin modifies the course of the disease by increasing the patient's immunity as is evidenced by the fact that the disease usually assumes a more chronic course during its

REPORT OF THE COMMITTEE ON HIGH FREQUENCY CURRENTS.

FREDERIC DEKRAFT, M.D., CHAIRMAN.

It would seem that the most important feature in the application of high frequency currents if the greatest attention to detail in administering the currents according to the methods described in the Report of this Committee two years ago.

Among the methods known the one of the bipolar utilization of the D'Arsonval current deserves special mention. When utilizing this method we should use just enough spark at the gap to overcome the resistance of the tissue included in the circuit. This circuit should be as short as possible in order that only those tissues shall be included which necessitate the effect of the current. Thus it is possible, by having two well insulated wires tied together in such a way that the cut ends of the wires allow the current to jump across, to obtain a spark of very great amperage but low voltage. This spark can be utilized in the cavities of the body for its destructive effect. Thus E. G. Keyes, Sr., destroyed papillimata in the bladder. This method can be used effectively in the nasopharynx and other cavities where a current of higher potential would not so easily be controlled. The bipolar method can also be used for its sterilizing effect on infected tissues. As instanced in the following case:

S. R., aet 45, superintendent of an apartment house, had run a nail in the palm of his hand for some depth some days previous to his visit to my office. The hand was badly swollen, very painful, red and hot, the pain extended up the arm to the axilla. A few minutes' application of the D'Arsonval current through the hand, from palm to dorsal surface (in other words, the shortest path through the site of the infection), using a pair of carbon electrodes, and one ampere of current, heated the part effectively. The pain ceased within a very few minutes after the application. All signs of inflammation and infection had disappeared on the following day.

Other cases of infected wounds have been treated in the same way with the same happy result. When it is remembered

* Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 13, 1910.



that this current is devoid of electrolytic effect, but has the power of heating the part to a degree commensurate with the volume of current employed and has inhibiting and destructive effects on toxins, its value and very wide application becomes apparent.

It will be noticed following such an application that there is marked anæmia at first which is soon followed by hyperæmia, which in turn increases phagocytosis and brings into play others of the natural defences of the body. It becomes pustular acne, furunculosis and carbuncles.

The concentrated resonator effleuve, utilized with a metal plate, attached to the D'Arsonval or Tesla, opposite the part to be treated is a most effective means of putting an end to pustular acne, furunculosis and carbuncles.

A young man came into the writer's office one evening asking to have some very painful acne pustules on his back cut open. He said that that was the only treatment which had given him any relief. On removing his shirt the chairman of this committee found his back a mass of scars and acne spots in various stages of evolution and variable sizes. After explaining to him the action of a very powerful but painless resonator effleuve intermingled with some sparks he consented to have this method employed on the most painful spots with the result of immediate relief from pain and disappearance of these spots. This pleased him so much that he came in on two subsequent occasions to have other acne spots which had reached a painful stage treated in the same way, with the result of total disappearance of the succession of crops of pustular acne on his body. The *modus operandi* here seems to be first a marked tissue contracting effect, marked anæmia and bringing into play the defences of the body, perhaps there is also a destructive effect of the streptococci, staphylococci and other disease germs, resulting in the elaboration of a vaccine; certain it is that the method is effective in the disease mentioned.

J. R., aet 24, driver, had had a succession of carbuncles for several years. He came to my office with a large carbuncle at the back of the neck which had not yet reached the stage of pus formation, but it was extremely painful. The pain extended to the head and to the right shoulder causing him to hold his head stiffly and in a most awkward manner. A thor-

ough application of the concentrated resonator effleuve stopped all pain in his neck, head and shoulder, and caused the swelling to become softer at once and also pale in color, the pain returning after about sixteen hours,—a second application to the following day stopped all pain and caused the swelling to feel very soft to the touch.

The patient on returning the next day had no pain but said he was sure there was pus in the swelling and begged me to open it, as he could not afford to lose the time from work. Yielding to his wishes, the swelling which was now but one-half the size it had been two days previously was cut, with the result of little bleeding, finding not a drop of pus, practically no pain from the incision and a peculiar paleness of the incised part. The wound healed in a few days without the formation of any pus or the return of the slightest pain or inconvenience. Other cases of this nature have been treated the same way with the best of results.

It would seem that we possess in the concentrated resonator effleuve a means of producing profound and prolonged anæmia of a part without electrolyzing action and without detrimental effect on normal structure but with a decided and certain sterilizing effect. In last year's report we spoke of the regulating action on the circulation of the D'Arsonval current.

G. S., aet 60, came to the office of the chairman of the committee in a very weak and debilitated condition. He had a fall from a car some months previous; since then had suffered from a variety of aches and pains in various parts of his body, dyspeptic symptoms, insomnia, excessive coldness of the hands and feet, pains in the head and complained of vertigo and impairment of memory, etc. In addition to this he had the care of a large estate and business complications which caused great anxiety and worry. He had been told by his physician that it was all due to "uric acid." He had been dieted and taken many drugs until he was discouraged and so feeble he could hardly walk. The coldness in his extremities was so great that it was painful. His heart's action was weak and intermittent, his pulse very compressible and slow. He was constipated—his head ached—his face was pale, his hands and feet cold to the touch. Here appeared to us a condition where the introduction of heat by means of a current of low potential and great frequency stimulate the circulation, flush the vaso-

rum, add to the efficiency of the digestive processes, aid the assimilative powers of the body, stimulate secretion, and rouse the vital powers to renewed and better efforts.

We placed him on the autocondensation couch and administered a current of 250 m., gradually increasing this to 450 m., utilized a spark gap at the exploders of $\frac{3}{4}$ in. In ten minutes his face became flushed, his hands and feet warm. In twenty minutes a gentle but warm perspiration began to be noticeable. Treatment was stopped; he felt refreshed, his head felt better, his mind was clear and he felt hungry for food, the first time in months. He came daily for treatment with the result of marked gain in weight and physical and mental strength, disappearance of constipation, insomnia, improvement in cardiac rhythm and cardiac and vascular strength. After two weeks of this method of treatment a mild wave current was applied over the liver daily for twenty minutes, with the result of such improvement in his general appearance and powers of endurance that he has become the marvel of his friends.

Such results might well tempt us to say in the language of those possessed of more business sagacity than scientific attainments that "electricity is life." It is true that recent investigations have shown by the aid of Einthovens Galvanometer that every heartbeat, every muscular contraction, is attended by the formation of a microscopical amount of galvanic current. Just what function this has to perform in the activity of normal body functions is yet unknown. Nevertheless it would seem as though we possessed in the method of autocondensation a powerful and certain means of introducing heat into the circulation, hereby stimulating vital processes to renewed activity. The action of heat to the extremities in surgical shock in lowered conditions of the vital powers, so often attending acute protracted and exhausting diseases, is as old as the practice of the healing art. It would seem as though a current devoid of electrolytic or destructive properties, if of the required low voltage and depending on its great rapidity of succeeding groups of oscillations for its heat producing powers would fulfill a need in the present stage of our civilization and methods of living.

REPORTS OF EXPERIMENTS TO DETERMINE THE EFFECTS OF HIGH FREQUENCY DISCHARGES ON BACTERIA CULTURES AND MEDIA.*

BY FREDERICK M. LAW, M.D.

A pure culture of streptococcus was planted on a dish of nutrient agar and placed in the incubator for 24 hours, until a full growth was obtained. The dish was placed on a grounded metal plate and the multiple point electrode, leading from the resonator, which was energized by a sixteen plate static machine, was fastened at two inches distant, so that a spark was playing directly on the growth. Duration of exposure two minutes.

A culture was taken from the sparked growth and planted on fresh agar and put in the incubator for twenty-four hours. This culture failed to grow.

A fresh culture of streptococcus was planted on the sparked agar and placed in the incubator. This culture failed to grow.

Another culture of streptococcus was grown on fresh agar, placed on a grounded metal plate and the electrode fastened six inches distant, so that a coarse effluve was playing on the growth. Duration of exposure five minutes. This culture acted in the same way as the first.

A glass vacuum electrode arranged for cataphoresis was obtained. The cavity was filled with agar and a culture of streptococcus grown on it. A piece of rubber tissue was fastened over the growth. The electrode was connected to the Oudin resonator from a twelve inch induction coil and the bulb held in the hands in such a way that it was surrounded, but no contact made with the rubber, nor any current penetrating the rubber. Duration of exposure fifteen minutes.

A culture from the growth on the electrode was planted on fresh agar and placed in the incubator. This culture grew.

A fresh culture was planted on the agar of the same electrode, and placed in the incubator. This culture failed to grow.

Another electrode was prepared with agar but no growth planted. This was protected and exposed in the same way.

* Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 15, 1910.

A culture of streptococcus was then planted on the agar and the electrode placed in the incubator. This culture failed to grow, though left in the incubator three days, but some of the culture placed on fresh agar grew.

Fresh streptococcus was placed in a capsule of celloidin and exposed to the direct sparks from the resonator and a culture made from it. This failed to grow when planted on agar. Exposing the capsule to the effleuve failed to kill the bacteria but delayed their growth.

Capsules containing streptococcus, staphylococcus and lactic acid bacillus were placed in pieces of liver, leaving a thickness of $\frac{1}{4}$ inch of tissue between the capsules and the surface of the liver.

These specimens were grounded and exposed in the same way to the spark for ten minutes and the effleuve for twenty minutes. One was also placed on a grounded plate and a vacuum tube from the Oudin resonator laid on the section for twenty minutes.

Cultures made from these capsules all grew when planted on agar, and cultures made from the normal bacteria in the liver itself all grew.

In the following experiment the d'Arsonval current was used in the bipolar form known as the method of thermal penetration.

A white mouse was placed on a metal plate attached to one end of the d'Arsonval spiral. The other end, leading to a carbon electrode, was placed on the back of the animal. A current gradually brought to 650 milliamperes was turned on. After the first contact the mouse did not move and in less than half a minute the animal was dead. The body was intensely warm but the hair was not singed.

In the next experiment the effleuve from a resonator attached to a high speed machine was used. A mouse was placed on a grounded metal plate and the electrode held three inches distant. There were pronounced muscular contraction and in fifteen seconds the animal was dead. He made no voluntary movement after the first four seconds. It is possible he was dead then.

In this case there was no increase of body heat. Cultures were made from the internal organs of these mice and all made a rapid growth.

From the above experiments we may conclude that: Bacteria exposed to sparks or effleuve were killed; bacteria exposed to the discharge from a vacuum electrode were not affected. Bacteria protected by animal tissue of thickness usually found in diseased conditions were not affected by the discharges.

Culture material exposed to sparks, effleuve or vacuum tube discharge was sterilized.

To illustrate the later conclusion I will cite a case.

A man came to the office with an abscess on his index finger which had persisted for five days. I opened it and expressed the pus, and dressed it in the usual way. The finger got progressively worse until the sinus extended on to the back of the hand. There was severe pain, swelling and a large amount of pus.

One evening, the third after he came, I expressed what pus I could, and then exposed the hand to the high frequency effleuve from a resonator energized by a twelve plate static machine. The duration of the exposure was ten minutes. The finger was dressed with a dry dressing. The next night there was considerably less pus and pain.

I repeated the treatment and the next night there was practically no pus, very little swelling and pain.

After the third treatment there was no pus and the sinus had commenced to close.

I stopped treatment after the fourth application and the finger was entirely healed at the end of a week.

This shows that the effleuve produced a sterilization of the tissue probably by the production of ozone in the tissue, thus preventing the further growth of bacteria, and by inducing hyperemia brought an increased flow of blood to the part, causing an increase in the phagocytes thus destroying the bacteria present.

Discussion.

Dr. William Benham Snow of New York: This report is one of the most valuable given. The original work done as given in the report by Dr. deKraft and Dr. Law is very important. I wish to speak particularly of Dr. Law's report, not having heard but the last part of Dr. deKraft's report. The experiments made with the mice in passing the current through them with fatal effect has opened up a field for further investigation

Infections in Allied Disorders. Part III. Malformations and Tumors. Part IV. Traumatism. Part V. Displacements. Part VI. Disorders of Menstruation and Sterility. The volume is well illustrated and contains many suggestions that are worth alone more than the price of the volume.

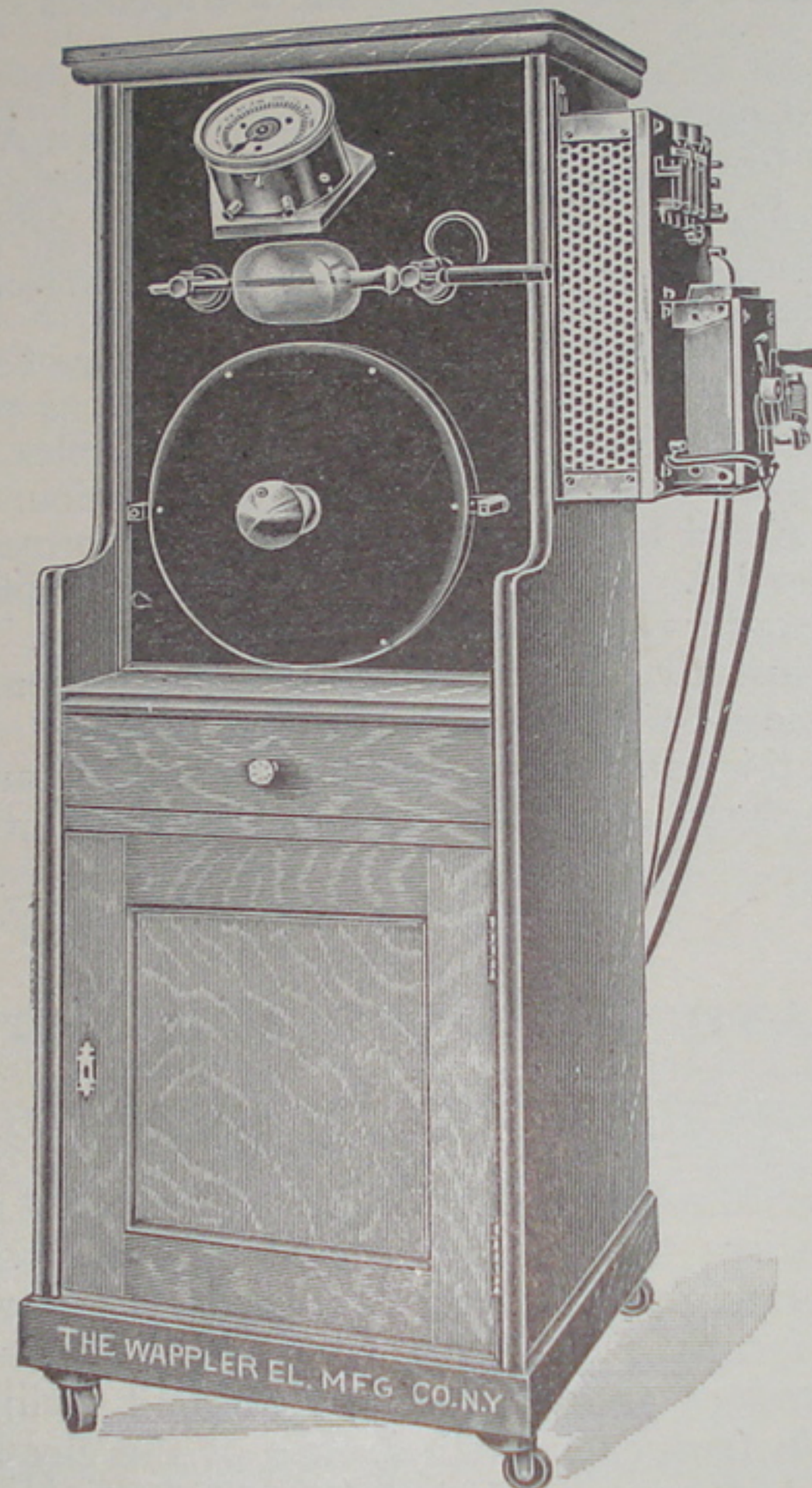
As a whole this series is a valuable one, and the authors are to be congratulated upon the amount of useful information collaborated.

NEW AND IMPROVED APPARATUS.

NEW HIGH FREQUENCY APPARATUS.

The Wappler Manufacturing Co. have introduced a new apparatus of efficient design, constructed on the closed circuit transformer principle. The apparatus draws from one to four amperes from the line. The effort of the manufacturers has been to produce an apparatus which shall oscillate at the highest possible frequency, with a view of thereby increasing the degree of heat generated for therapeutic purposes. The apparatus is designed for giving d'Arsonval and Oudin currents, and also for the employment of fulgeration methods. The apparatus is constructed in two parts; one being designated by the manufacturers as the desk type of apparatus. The illustration shows the piano type of interrupterless high frequency apparatus as constructed for the direct current. The lower part of the apparatus contains an especially powerful rotary converter that is regulated by a starting box mounted on a switchboard. A simple rheostat controls the minimum

and maximum secondary current. The rotary converter is readily accessible and practically noiseless in operation. The piano type for the alternating current is mounted as described above, the only outside difference being that no starting box is required. The front of the apparatus is finished in heavy black plate glass. Cabinet work is of the highest grade French finish in either solid mahogany or quarter sawed oak. The



resonator, Leyden jars, milliamperemeter and other parts are of the same high grade of workmanship as furnished on our most elaborate apparatus. A desk type apparatus is manufactured for use with the alternating current. The price of the apparatus varies from \$125 for the desk type without hot wire meter, to \$275 for the direct piano type with hot wire meter all complete. The apparatus is manufactured and for sale by the Wappler Electric Manufacturing Co., 173-175 East 87th St., New York.

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WHAT ELECTRICITY WILL DO IN THERAPEUTICS.

MOST neurologists and their followers believe that electricity is merely a placebo, a suggestive measure, capable of no particular therapeutic property. Probably the reason that these men take this attitude is ignorance of the progress in these matters, and not duplicity.

As a matter of fact, there is no agent in therapeutics to-day which covers so wide a range of utility and is so effective in the therapeutics of nervous diseases, and of inflammation in general, as the various electrical modalities. The man who talks of electricity in an indefinite way, and considers the old-fashioned battery current as in any way similar to the currents employed in the modern electro-therapeutic methods is behind the times. And so it is looked upon by the majority of the medical profession.

An intelligent retrospect of electricity as employed in therapeutics considers it from the point of view of the various qualities and characteristics of the currents produced by the modern types of apparatus.

The static current, which has most often been considered as a placebo by the skeptics, and only a suggestive measure, is the most potent mechanical agent in therapeutics. The modalities of the static apparatus act by inducing *tissue activity* and